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Remarks

This is an amendment under 37 CFR § 1.116. The purpose of this amendment is to put the claims in better form for appeal. The amendments and specific arguments in this amendment, to the extent they were not presented earlier, are now presented because they are necessitated by the new arguments of anticipation and obviousness set forth by the Examiner in the official action dated 18 May 2005. The applicants respectfully submit that these amendments do not raise new issues and do not require any further searching.

I. SPECIFICATION

The disclosure is objected to because, in paragraph 0001, the serial number for the related application is incomplete. The applicants have set forth above a substitute paragraph 0001 that sets forth the serial number of the related application. The applicants respectfully request that the objection be withdrawn.

II. CLAIMS

A. Claim Rejections Under 35 USC § 102(e)

Claims 1-3, 12 and 19 are rejected under 35 USC § 102(e) as being anticipated by United States patent application publication no. 2003/0020126 of Sakamoto et al. (*Sakamoto*). The official action alleges that Sakamoto discloses all of the elements of the above-mentioned claims. However, the applicants respectfully point out that Sakamoto discloses forming the through holes TH after the electrodes 14, 15, etc. have been defined. See Sakamoto's Figures 11B and 11C, and paragraphs 0016 and 0017.

In accordance with the invention, the die mounting pad and conductive connecting pad are formed after the through hole has been filled with the conductive interconnecting element. See, for example, Figures 5B and 5C. This forms the die mounting pad and conductive connecting pad with a surface uninterrupted by the through hole. The applicants have amended Claim 1 to make the order in which the filling and forming elements are performed. The applicants respectfully submit that Claims 1-3 and 19 as now amended do not read on Sakamoto's disclosure and that Claims 1-3 and 19 are therefore patentable.

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The applicants further submit that Claims 2-19 that depend on Claim 1 are also patentable because of the patentability of Claim 1.

B. Claim Rejections Under 35 USC § 103(a)

1. Claims 4-7

Claims 4-7 are rejected under 35 USC § 103(a) as being unpatentable over Sakamoto in view of United States patent application publication no. 2003/0040138 of Kobayashi et al. (*Kobayashi*)

The official action admits that Sakamoto does not expressly disclose that the mounting pad and the connecting pad can be formed through plating on a seed layer, and looks to Kobayashi for a teaching of the missing element.

The applicants respectfully disagree with the reading of Kobayashi's disclosure set forth in the official action: Kobayashi explicitly states that elements are "Cu foils" pressure bonded to both faces of a glass-epoxy substrate 5 (paragraph 0013). Electrodes 7 and 8 and die pad 9 are formed by patterning the Cu foils (paragraph 0014). Paragraph 0016 describes plating electrodes 7 and 8 with gold to facilitate their use as bonding posts and plating the die pad 9 to facilitate its use as a die-bonding post. Gold layers deposited for this purpose are typically thin compared with the underlying metal.

Kobayashi later describes a package based on a ceramic substrate in paragraph 0019. In paragraph 0019, the front and rear surfaces of the unfired ceramic substrate are described as being "printed using conductive paste." Paragraph 0019 also suggests by reference to Figure 15 that the printed layer of conductive paste may later be plated. However, the applicants have been unable to find anything in paragraph 0019 of Kobayashi's disclosure that teaches or suggests that the printed layer serves as a seed layer that is later plated with additional material to form a structure with a thickness substantially greater than that of the seed layer. As noted above, the gold layer deposited as described in Kobayashi's paragraph 0016 on the electrodes and die pads to facilitate bonding to these elements is typically thin compared with the underlying layer. Accordingly, the applicants respectfully submit that the layer of conductive paste described by Kobayashi as being deposited by printing cannot accurately be described as a seed layer. The

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applicants therefore respectfully submit that the proposed combination of references does not teach all of the limitations set forth in the claims.

Moreover, the applicants respectfully submit that the prima facie case of obviousness set forth in the official action does not comply with the requirements set forth in MPEP § 2143. The official action states:

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the pad-plating method of Kobayashi into the method of Sakamoto, so that a method for making a semiconductor device with low cost would be obtained.

The applicants note that the official action does not indicate where in the cited references may be found the motivation set forth in the official action for combining the references. Kobayashi's disclosure mentions cost in several instances, but the applicants have been unable to find anything in the cited references that indicates that the pad-plating method disclosed by Kobayashi results in a reduction in the cost of making a semiconductor device. Accordingly, the applicants respectfully submit that the proposed combination of references is improper because no proper motivation exists to combine them.

Additionally, the official action does not indicate where in the cited references may be found a teaching or suggestion that would provide a person of ordinary skill in the art with a reasonable expectation of success in the event such person were to attempt to combine the references as suggested in the official action. Accordingly, the applicants respectfully submit that the proposed combination of references is improper for this additional reason.

Accordingly, the applicants respectfully submit that the rejection of Claims 4-7 is improper and that Claims 4-7 are therefore patentable.

2. Claim 8

Claim 8 is rejected under 35 USC § 103(a) as being unpatentable over Sakamoto in view of Kobayashi, and further in view of United States patent no. 5,298,687 of Rapoport et al. (*Rapoport*).

The official action admits that Sakamoto and Kobayashi do not expressly disclose that the seed layer can be formed by screen printing and looks to Rapoport for a teaching of the missing element.

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The applicants respectfully submit that the prima facie case of obviousness set forth in the official action does not comply with the requirements set forth in MPEP § 2143. The official action states:

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the seed-layer screen-printing step of Rapoport into the method collectively taught by Sakamoto and Kobayashi, so that a method for making a semiconductor device with low cost would be obtained.

The applicants note that the official action does not indicate where in the cited references may be found the motivation set forth in the official action for combining the references. Rapoport discloses a process for forming a multi-layer connection that allegedly reduces manufacturing costs. The example of the process described in cols. 6 and 7 of Rapoport's disclosure involves 20 process steps. In only two of these process steps are seed layers deposited by screen printing. The applicants have been unable to find anything Rapoport's disclosure that indicates that this one step of depositing a seed layer by screen printing is solely or substantially responsible for the reduced manufacturing costs of Rapoport's process. Accordingly, the applicants respectfully submit that Rapoport's claim of reduced manufacturing costs cannot serve as a proper motivation to adopt one relatively minor aspect of his process, as proposed in the official action.

Moreover, Rapoport identifies a number of elements that contribute to lower cost, but none of these is the deposition of seed layers by screen printing. The applicants respectfully submit that such teaching by Rapoport teaches away from adopting the deposition of seed layers by screen printing.

Moreover, the applicants have been unable to find any teaching or suggestion elsewhere in the cited references that indicates that depositing a seed layer by screen printing results in a reduction in the cost of making a semiconductor device. Accordingly, the applicants respectfully submit that the proposed combination of references is improper because no proper motivation exists to combine them.

Additionally, the official action does not indicate where in the cited references may be found a teaching or suggestion that would provide a person of ordinary skill in the art with a reasonable expectation of success in the event such person were to attempt to combine the

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references as suggested in the official action. Accordingly, the applicants respectfully submit that the proposed combination of references is improper for this additional reason.

The applicants respectfully request that the amendments set forth above be entered and that Examiner reconsider the rejection of the rejected claims. The applicants believe that the application as now amended is in condition for allowance, and respectfully request such favorable action. If any matters remain outstanding in the application, the Examiner is respectfully invited to telephone the applicant attorney at (650) 485-3015 so that these matters may be resolved.

Respectfully submitted,

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